WORKING WITH EDUCATIONAL GAMES
Fundamental guidelines for developers and educators interested in working with educational games

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BACKGROUND RESEARCH
For additional conclusions and guidelines, as well as more details on the research behind this report:

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This report has been compiled as a part of the EU-interreg IV A funded project Scandinavian Game Developers. The project is a collaboration between Region Midtjylland, Viden Djurs and The Ranch Game Incubator, Århus Social- og Sundhedsskole, The Animation Workshop, and the University of Skövde.
This short guide to using and developing games for use in classrooms was written during the European Union Interreg IV A funded project Scandinavian Game Developers. Scandinavian Game Developers is a collaboration between researchers (the University of Skövde), educators (Århus Social- og Sundhedsskole), and developers (Arsenalet and The Ranch Game Incubator), and this guide is an abridged overview of some of the important conclusions our group has reached during our work in the project. Whether you’re a game developer, teacher, or principal interested in educational video games, we hope that this guide will serve as a good tool for you to improve your understanding of what educational games are. As an educator, you’ll get some insight into what a game might bring to a classroom environment as well as the different challenges you might face when trying to use games in your regular teaching environment. For developers, we’ve put together some guidelines that will hopefully make your first educational game projects flow smoother and properly prepare you for some of the more common challenges that many educational game projects encounter.

If you find this reading interesting and want to find out more details on the development and use of educational games you can turn to the licentiate thesis produced during this project, Games in Formal Educational Settings: Obstacles for the development and use of learning games by Björn Berg Marklund, published at the University of Skövde.

As a final note, I would personally encourage the reader to keep in mind that this guide is not a strictly academic text – in fact it deliberately avoids heavier academic discourse in favour of brevity and readability, essentially so that it doesn’t exclusively consist of sentences like this one. This text primarily intends to inspire discussion and to help teachers and developers approach educational games with a better idea of what to expect from them.

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Games and Education

Games and education have, to put it lightly, always had a turbulent relationship. On more than one occasion, games have been viewed by educators and the general public as detractors and distractors from activities deemed more serious and valuable. During certain time periods, computer- and video games were at best called a “waste of time” and at worst declared directly harmful to children and young adults. But as is the case with any technology or medium (e.g. VHS and television), games have grown into public acceptance as they started to get into more peoples’ homes and everyday lives – games are not as isolated and alien as they used to be, and the stigma around the word “video game” is starting to unravel. As the knee-jerk reactions against video games start to subside, the discussions regarding games are starting to focus more and more on the positives. Games are environments that present us with many interesting and unique opportunities for communication, engagement, problem solving, creative expression, and community building. These qualities can be put to good use in many different areas, one of the biggest ones being education, and games are frequently being experimented with as an asset that can radically improve teaching processes. But it is crucial to keep a level head when delving into this discussion, in some sense the pendulum seems to have made its full swing from the vilification of games we saw in the late 90s and early 00s to the nearly unhindered adoration we see today. Neither extreme is very fruitful to side with, but there is a middle-ground where you can look at games with healthy scepticism and cautious optimism and see them for what they are, and what they are not, and start putting them to good use where they are suitable.

Games are often celebrated for their unique capacity to represent and simulate complex systems and invite players to experience and interact with them first-hand. They allow the player to form an understanding of intricate subject matters based on participation and experimentation rather than mere observation, and thus they are often argued to have great potential as educational tools. In a game, the player can take on the mantle of a medieval ruler, a soldier in the midst of a historic conflict, a business tycoon, or essentially any other human or non-human individual that can be imagined. If the game is well-crafted, the player can spend hours upon hours engrossed in it, trying to master whatever challenges the game contains. Many games are naturally designed to become progressively more challenging to keep the player interested, too. It introduces new concepts, items, manoeuvres, or characters that the player needs to experiment with and figure out in order to be able to confidently put them to use and to continue progressing in the game’s narrative.
Given these qualities and the wide variety of game genres out there, it seems as though games could find a natural place in classrooms to teach a wide variety of subjects in a hands-on and participatory manner. Games seem to correspond nicely to most buzz-words frequently thrown about in the debates surrounding education – the “new” era of education should be engaging and motivating for students, it should be participatory and active instead of passive, and it should invite students to interact with new technologies to give them the “21st century skills” that nowadays seem essential to surviving in contemporary society. While all of this rings true to some extent, it is dangerous to assume that merely throwing a game into a classroom will create a positive learning environment that embody all those desirable values. Games are complex technologies, and while they do provide many exciting new opportunities they also have their own limitations and unique requirements that both developers and educators need to be aware of if they want to use them effectively.

Games can certainly be put to good use in classroom environments. But it's important to keep in mind that a game is a tool; a tool with some unique and endearing properties certainly, but a tool nonetheless. As with any other tool it needs to be used correctly in order to function efficiently (or to function at all). In this abbreviated guide we will take you through a crash-course that will hopefully expand your understanding of educational games. The guide is written to be useful whether you’re a developer or an educator, and I’ve collected some of the more common concepts, concerns, possibilities, and pitfalls that you will likely face when embarking on an educational game project.

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A BRIEF RETROSPECTIVE
Using, or at least attempting to use, computer- and video games for educational purposes is not a particularly novel concept. You're likely aware of some of the “edutainment” titles that were available in the 80s and 90s yourself – some of the more widely recognizable ones are Where in the World is Carmen San Diego and Math Blaster (or maybe the Backpacker, Chefreens Pyramid and Krakel Spektakel series are more familiar if you went to a Swedish school in the late 90s). But these types of educational games have actually been around for about as long as
commercially available video games have, and they have evolved alongside each other since
the early 70s.

The game *Oregon Trail* is a seminal title in the educational game genre, it was first created in
1971 specifically for use in classrooms at a school district in Minnesota. Not only is Oregon
Trail one of the first educational game titles released on a digital platform, it still regularly
gets updated and re-made to this day. The significance of Oregon Trail is that it was devised
around the same time as video games started becoming available as home entertainment.
There had certainly been a few primitive, primarily mechanical, games for arcades and bars
a few years prior, but in the early 70s video games became a more open consumer market
thanks the advent of home consoles with the Magnavox Oddysey being released in 72 and the
popularization of home computers with the release of the Apple II in 77.

In these early days, the ambitions regarding how educational games (back then often referred
to as *edutainment*) would change the educational landscape were very high. As computer
simulations became more and more advanced and showed few signs of slowing down their
progress the ideas of what games could achieve continued to grow. The problem with inflated
ambitions, however, is that it’s hard to actually fulfil them. Educational games failed to keep
up with the rapid increase in quality of entertainment games that received much larger
development budgets, and controversies around inappropriate content in certain games made
many parents and teachers wary of putting them in the hands of children. These factors,
among many others, led to a rapid decline in the interest in educational games and in the very
end of the 90s, the edutainment game market had essentially evaporated completely.

Shortly thereafter in the 00s, however, interest once again started to pick up. More and more
research pointing to the benefits of using games for healthcare, training, rehabilitation, and
education started to emerge, and games also became more easily available to a wider audience
through social media and mobile gaming. Interest in educational games is currently very
high, and new examples of games being put to interesting uses in schools pop up frequently
from places you wouldn’t have expected a few years ago.

Educational games have certainly had their fair share of ups and downs and they still haven’t
really “settled down” in a less turbulent position either. The now popular term *Gamification*
is a good indicator that we still aren’t really in agreement of how to treat games as tools for
things beyond escapism. New terms that try to encapsulate what games can do for education,
healthcare, and society at large emerge every now and then and each one carries new values,
guidelines, and agendas with it. Throughout the Edutainment, Game-Based Learning, Serious
Games, and Gamification paradigms there has always been tonnes of different opinions
regarding how to do things right. Yet it rarely seems to happen at the scales one would expect
given the rhetoric used by many educational game evangelists.
In this section, some of the more common challenges schools face when they start to use games in their educational processes will be described and discussed. Games can be an attractive proposition from an educator’s perspective due to their proclaimed ability to offer students engaging, motivating, and (to them) familiar learning environments. Games are just one of many technologies that schools are trying to make better use of as technology has become increasingly ubiquitous in society and in students’ everyday lives. Students have certain expectations on what tools should be available to them, and educators see a need to cater to these expectations to make the students feel comfortable and unhindered in the classroom. It is certainly a good end-goal to work towards, and games can expand and improve upon educational practices a great deal. However, when you attempt to lift a game with content that can be used for educational purposes into an educational setting, problems can start piling up rather quickly. Most games are not inherently suitable for use in a classroom context – even games that are designed and marketed as “educational” can be poorly suited for use in a formal educational setting. Simply put, a great deal of complex components need to be correctly orchestrated in order to make educational game sessions possible, even ones that are relatively rudimentary. For example, teachers need to have the right equipment and understanding to effectively use games in their teaching, and the school or classroom needs to have the correct technology reliably available for game sessions to run smoothly.

**The Game is a Tool, Not a Solution**

First off, it’s important to start out an educational game project or course with the right mindset and expectations. A big concern teachers often have regarding educational games stems from the misconception that the end goal of using games is to entirely replace traditional teacher led education in the classroom with a more efficient and “engaging” alternative. This misconception has unfortunately found some footing within both educator- and developer communities, and it causes problems on both sides. Treating an educational game as an all-encompassing multi-purpose tool that contain all steps of a learning process is always problematic. It makes educational games seem quite threatening and intractable, and it also often leads to disappointment among both teachers and students since there is no educational game that can feasibly accommodate for all potential needs that arise in a classroom.

For teachers, it is important to think of a game as an educational tool that should elevate and facilitate situations for learning in your teaching environment and on terms you’re comfortable with. The point of a game should not be to replace or dominate the existing educational environment; it should provide you with opportunities to expand learning activities in new directions – for example by giving you and your students an environment to experience and experiment with different concepts first-hand.

A big challenge for educational digital games is that this perception that they are opaque technologies that can only serve to replace entire educational processes, rather than specific tools that can be used to elevate or modify certain parts of them. Opaque, in this sense, refers to the technology not allowing its users to get any insight into its internal workings – which makes it impossible for the user to modify or change the technology to make it more suitable for their individual needs. If you feel separated and
excluded from understanding the way a machine or device functions, it can be very uncomfortable to have to blindly trust that the device is built on sound principles and that it works well for your intentions as an educator. This challenge can be approached in two ways depending on what type of educational game project you’re getting into. You can work together with a developer to create or modify a game to fit into your educational process, or you can tailor your educational process around a game you find that looks suitable for teaching your subject matter.

**If you’re working directly with a game developer** to create an educational game, make sure that there is an open dialogue between you and the developer throughout the project. As an educator you know details of the subject matter you’re teaching and the details of your school and its students better than the developers do, so make sure that you invite the developers to understand the situation as well so that they can create a suitable game for it. You also need to go into the project knowing that you know less about game design and development than the developer does, so you also need to be receptive to what they have to say. The game should primarily have a clearly stated function in your educational setting, it’s seldom enough to just proclaim that “I want a game that teaches the English language”. You need to think about the way you teach English, and work with the developers to identify a place in your teaching process where a game could have an interesting use. Maybe you prefer working on collaborative exercises in the classroom in which students need to use their English vocabulary to solve problems together. In this situation, the game itself can in fact contain very little actual English – but the students will still need to communicate with one another in English to solve the challenges presented by the game. The matter of “what the game needs to represent” is very important to figure out, and comes down to your own teaching methods. The game does not necessarily have to contain all the details of the subject; you can for instance make sure that the core of the subject is introduced in lectures and other classroom activities and then use the game as an environment where students put their knowledge to the test in interesting ways. But it can also work the other way around – the game can introduce the details of a subject and allow students to experiment and interact with it, which can be followed up with discussions, lectures and presentations in the classroom where students get a chance to reflect on what they experienced in the game.

**If you’re not working with a developer** and you are instead looking at existing games that you think represent a subject matter well, you need a slightly different approach. Going into educational games without any connections to developers places more responsibilities on you as an educator. It requires you to spend even more time with games, trying them out and identifying their relevant parts to your subject – in a sense you need to start thinking like a developer and create a good educational tool out of a bigger and bulkier game. Since there’s a limit to how significantly you can change the game itself without its developer to help you, you will need to modify the educational processes around the game. Most games are not designed to teach a very specific thing and can have a lot of content that is superfluous to what you want to achieve in the classroom. In general, games want to entertain and engage their players for long periods of time, but as a teacher you’re working with very strict time limitations and thus need to focus on the parts of a game that are relevant to your lesson plan. *Minecraft* is a very good example of this because it’s a very big game that many educators have put to good use by focusing on smaller segments of it. *Minecraft* is the type of game you can spend a lot of time in since it’s very rich and varied in its content. You
can build and decorate a home, recreate national landmarks, battle monsters and players, explore, collect resources, start a farm, among many other things. But if you want to just use the game to teach mathematics, for example, a lot of those functions won’t really effectively contribute to that goal unless you know how to set up expectations and rules for your students before you start playing. Maybe you skip all other parts of the game and just focus on mathematically describing optimally efficient collection of different resources. Or maybe you task students with finding ways to visually represent the effectiveness of different tools in the game. Both of these approaches require the student to look deeply into the game’s mechanics, to describe the basic mathematical concepts behind them, to finally try out their theories in the game. This can once again be followed up with presentations and discussions in the classroom. You need to make sure that the game has a well defined part in your bigger educational process, just as you would when working together with a developer.

Thinking of the game as a part of a bigger educational process is really the core mindset that this guide wants to promote. Games can do many things very well, but they certainly cannot do everything at once. Especially not without solid supporting structures around them. If you think of your educational process as encouraging your students to discover, research, experiment, analyze, and reflect, you can start mapping out the parts of the process in which a game could play an important role. A game can introduce a concept and help the students discover something interesting they want to know more about. It can be a venue for finding out more about a certain phenomenon, a principle, an event, or a person. It can be a platform for experimentation and interaction with something they couldn’t normally interact with. In short, a game can play one or more parts in this process, but you need to make sure that you encourage your students to actively reflect on what they are doing, to articulate it to themselves, to you, and their classmates.

The most important actionable advice here, regardless of where in your educational process you use a game, is to always find ways to tie the game activity to the physical and social space of the classroom. Just like you would when you read a book, watch a movie or a play, or have a field trip with your students – you always want to encourage them to discuss and deliberate on the experience and its meaning both before and afterwards. Games are not magical environments where students learn automatically, they learn once they start to actively reflect on what they are experiencing or have experienced.
THE STRUCTURE OF EDUCATION VS. THE REQUIREMENTS OF GAMES

Another common concern educational games are facing is that they can add significantly to teachers’ workloads. This concern is very well founded and should not be disregarded as mere superstition or an overly critical perception of games – games are complex things to use and place heavy requirements on an organization’s technology, resources, and support structures in order to work reliably.

The vast majority of teachers are already hard pressed to fit all their lesson planning and individual teacher-student hours into their workday. Starting up a project where a completely new technology is to be introduced into the classroom situation is a laborious and time-consuming task, especially if the classroom environment does not have the proper infrastructure required to make use of new technologies. In this case, infrastructure refers to a school’s technological devices, resources, competencies, and the organizational structures needed to support the use of educational games in classroom environments. For example, teachers’ available working hours, their technical know-how and understanding of games, the funds available to support purchasing and implementing new educational tools, availability and maintenance of technological devices necessary for play scenarios, and good support from the organization’s IT-department are all factors that you need to take into account when you start working with educational games.

The teacher’s experience and expertise is particularly crucial. The teacher needs to understand the game in order to understand what students are doing within it, and be able to translate game progress to curriculum progress and learning goals. The teacher also needs to be skilled at setting up gameplay sessions in a limited amount of preparation time. As discussed previously, teachers also serve the important role of anchoring the game sessions as learning activities, so they need to know how to contextualize the game content in the subject matter being taught (or vice versa). A deep understanding of the game being played can also be important for evaluating student progress through the curriculum. For example, if you notice a student has become very knowledgeable of something inside the game you are using in the classroom, you need to be able to “translate” that knowledge to progress in the curriculum. This can be a bit tricky, since games sometimes offer the player many different ways of reaching certain goals.

On the technological side of things, all necessary technical components need to always be available to support teachers’ working processes. Basic practical necessities like the availability of computers and tablets for preparing and conducting game sessions can be difficult to maintain, but teachers need to be able to trust that the necessary technology is reliable and available. If it isn't, a teacher takes a very big risk if they build their lesson plan around game activities – if technical difficulties or problems running the game arise unexpectedly during a semester, a lot of planning can go to waste.

In all these cases, educators are put in a bit of a bind. While many educators are excited to use games and tap into all the interesting things you can do with them, games are as of yet not as reliable as traditional means of education. Working with books, lectures, and
presentations provide easier methods for assessments and evaluations; the learning that takes place in games can seem inefficient, indecipherable, and difficult to assess in comparison. The same goes for the problems of technology requirements and reliability, games can put high demands a school's technological infrastructure, and more often than not schools are far better suited for traditional educational tools rather than the use of advanced games.

Unfortunately, there are no generally applicable solutions to these problems since every individual school's infrastructure and organizational culture is unique. Every school has their own areas in which they excel and ones where they often run into issues. If you’re an educator that wants to start working with games, the first thing you need to do is take inventory of your surroundings and find the strengths you can leverage and the shortcomings you need to either work around or work at improving. These conditions will be the fundament on which you build your game-based lesson plan, so make sure that you understand what you’re working with – and don’t be afraid to start small to test the waters. If you’re working alongside a developer, you should have plenty of opportunities to make sure that the game can fit well into your working situation as well. Don’t forget that your students are an immense asset too, and they likely have a lot of ideas themselves on how some of the games they enjoy could fit into their learning environment. Having your students deeply reflect on how a game can be useful for learning certain things can be a valuable learning opportunity in itself, so discussing your plans openly with your class can be very rewarding.

Both educators and developers need to be aware that learning games require a great deal from a school’s infrastructure in order to work well. The importance of understanding the practical constraints and opportunities of the setting you’re working in cannot be overstated. If you’re only thinking about the conceptual aspects of educational games – how to make sure they are as fun as possible, or what your students should learn from them – without considering the practical realities you’re working with, you can run into big problems quite early. In the end, failing to take the practicalities of formal education into account will always prevent you from achieving all of the promising goals you set out for yourself.
Remain cautiously optimistic

Lastly, a personal recommendation I have for educators is to regard all examples of highly successful or wildly unsuccessful uses of educational games with cautious optimism and healthy scepticism. Successful examples are of course worthy of admiration and can serve as great sources for inspiration and guidance, but one should never forget the that the local conditions are unique for every school – that of course includes the schools where educational games have been put to good use.

The average classroom doesn’t inherently possess all the gadgets and supporting structures that can be necessary for larger educational game projects to work. In situations where educational games have been put to good use, the parents, teachers, principals, and students have often done a lot of important ground-work that can be hard to see if you only look at their resulting successful use of games. If you focus too much on achieving their end result right away you will likely find yourself struggling since the same underlying structures might not be in place at your own school. The same goes for unsuccessful examples, the structural issues that prevent other educational game projects from working out might not be as prevalent in your educational setting. This relates back into the issues of infrastructure discussed previously - you need to know the strengths and shortcomings of your own institution and use that as a starting point. If you have little experience using educational games, start small! You can for instance look at one interesting detail of one of the big successful examples out there and try to set up a situation where you can achieve that particular result – you don’t immediately have to convert your entire classroom or course to a Minecraft project, or have all your lessons taught in World of Warcraft or Second Life. Consider how you want to use games in your teaching and look at the steps you could take to approach that goal. If it’s possible, you should try to find out as much about the school and its organizational structure as possible if you want to try to replicate others’ successful examples of educational game use.

Now, it’s important to not misconstrue this warning as strict pessimism or cynicism – it’s rather a recommendation for educators to keep inventory of the possibilities and limitations afforded to them by their own working circumstances. The processes and games used successfully at other schools are rarely universally applicable, but if you look at the tools available to you, you will find your own way of putting educational games to good use in your own school or classroom.

If you’re inexperienced with games, you can always start small. If you’re interested in seeing what it’s like to use or design gameplay for teaching purposes, it might not even be necessary for you to work with digital technology. Board games, for example, can be very accessible means of doing educational gaming. They have a much lower technical barrier to entry, don’t place as high demands on a school’s infrastructure, and are easier to create or modify than their digital counterparts. Once you get used to the idea of using gameplay to convey different types of lessons and start feeling limited by what you can do with board games, you can start looking at more advanced types of games if you feel that it’s necessary. With your increased familiarity with games and how they work in your own educational setting you might have an easier time identifying suitable digital games to start working with. But keep in mind that digital games aren’t inherently superior to non-digital games, both have their own set of properties that make them suitable for different types of learning situations.
To reach a point where educational games can provide good educational value, high utility, and an interesting and motivating experience for students your school needs to be ready for them. Some games place higher requirements on your environment than others - highly advanced games need advanced technology and game-savviness on the part of the teacher. If an environment does not have the right setup to support a game, it won't be very useful and it won't be able to provide good educational value nor a good experience.

The state of these different factors are unique for every school - for instance, you may have access to reliable and modern technology but little experience using it and working with games. Each of these aspects of educational games can be supported both by the educator and the game's developer. To improve a games utility, for example, the school can improve its technological infrastructure or the game can be made less technologically advanced.

### Examples of improvements or conditions that can elevate the educational value, utility, and experience of games.

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<thead>
<tr>
<th>Educational value</th>
<th>Utility</th>
<th>Experience</th>
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<tr>
<td>With “standard” conditions</td>
<td>Game-adapted educational process</td>
<td>Reliable technology</td>
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### THE DEVELOPER PERSPECTIVE

In this section, we delve into some of the basics of being an educational game developer. Some of the primary takeaways from this part of the guide will be a brief overview of how developing educational games differs from developing entertainment games both from a business and marketing perspective and from a game design perspective. The section will also provide some insight into how the structures of education will influence your working situation, and some guidelines for how to design and develop a game that can fit formal educational settings well.
THE EDUCATIONAL GAMES MARKET

Just as there are different approaches available for educators when they start working with educational games, developers also face a choice of a couple of different approaches when they design and develop them. As a developer, you can either focus your efforts on creating a game that is specifically tailored to an educational setting, or you can try to create a game that has broader usefulness and can fit into many different types of settings and subjects. In the following discussion, the approaches will be referred to as creating “tailor-made” and “adaptable” games respectively.

Both approaches have their own benefits and shortcomings, and in some sense you decide on your general approach as soon as you choose the business model for your educational game studio. When you create tailor-made games you often work closely together with different educators, schools, or different branches of municipalities – which means that you work on specific commissioned projects rather than coming up with your own products from scratch. In this case, your consumer is already decided for you since it is the client you’re working towards, and even though you might get to own the created intellectual property after the project is over it is often difficult to spread a specifically tailored educational game to a broader market. As discussed earlier in the chapter for educators (page 12, to be more specific), the internal workings of different schools can be very specific, so a game that is tailor-made to fit into one school might not work very well in others.

If you create adaptable games, you have more opportunity to work on your own, but you take a bigger risk since your development process might not be funded by a project or an already existing client. But on the positive side your game will likely have better potential on an open market once it is completed since it can fit into many different educational settings – the caveat here is that it obviously places some additional responsibilities on the side of educators since they will need to figure out how to use your game in their educational setting themselves. To make your game more accessible in this regard you can provide some guidelines and examples of how a teacher can use your game. This can help you reach out to new clients since they might have no other way of understanding your thought process and intentions when creating your game.

So from a developer’s perspective, there is a significant difference in how tailor-made and adaptable games provide revenue. Tailor-made games are usually created by commission from a client in education. The general marketability of the created game is likely to be limited and thus the game itself won’t provide much revenue, but the development is somewhat safer since it’s paid for by a client and the risks for you as a developer are thus very low. Adaptable games, conversely, have a wider marketability after their completion and can be a worthwhile pursuit for companies who do not wish to work on a contractual basis. A couple of companies that exemplify each of these principles are Serious Games Interactive in Denmark that primarily creates tailor-made games, and the Finish/American studio TeacherGaming LLC who are working with a highly adaptable game.
Adaptable games can potentially be inserted into many different educational settings and thus reach a broader market. The entry-cost will also be lower for educator since they don’t have to pay for the game’s development. Adaptable games, however, can’t accommodate as well for an individual school’s needs as a tailor-made game can. On the other hand, tailor-made games are rarely as easy to market to other educational settings than the one it is designed for.

DESIGNING FOR THE CLASSROOM AS AN AUDIENCE

The peculiarities of designing a game that has the pupils in a classroom as its audience can catch many developers by surprise. Both developers and educators are frequently told that students like games, period - as long as you create a gameplay experience that is centered around a school subject and adheres to all the criteria we judge good games by, you’re bound to have a game that fits well into a classroom and engages its students. In reality, this is not really the case. The main reason for this is that a classroom full of students constitutes an incredibly heterogeneous audience. If you look at your average classroom of 25 or 30 students and try to find significant common attributes between them, you’d be hard pressed to find more commonalities than their age and that they live in the same school district. Classrooms are melting pots of students with different backgrounds, hobbies, skills, interests, ambitions, as well as computer- and gaming literacy; creating a game that is usable and fun for all of them is very difficult. As opposed to creating entertainment games, you’re not really allowed to be exclusionary in your design either. When you create an entertainment game, the consequences of focusing your game design to cater to a specific type of person is that the consumers that are not attracted to the game concept won’t purchase the game. Educational games that are to be used in formal education have far more intense requirements when it comes to reaching an audience.

To give a more direct example of differences between entertainment and educational games: consider a complex and time-consuming historical strategy game like Europa Universalis 4. If you’re the developer behind this title, you have made a deliberate decision to cater to history buffs and hard-core grand strategy game fans. Catering to a niche market in that way is totally fine when working with entertainment games. You cannot, however, create an educational game that only caters to a fraction of a classroom’s students – while those particular students might be very excited and engaged by the game, you’ve made your game impossibly impractical in the eyes of the teacher and likely quite dull in the eyes of the rest of the students in the class.
There are no easy shortcuts for circumventing this challenge, but being aware that educational game design is difficult can help you better prepare for what you need to consider or discuss with your clients. If you’re working closely with a school, involving students or teachers as co-designers during the development process can be an efficient way to make sure that your design takes their preferences into account. But keep in mind that you’re bringing an important skillset to the table. You are the final arbiter of making sure that the game has a coherent design vision and that it doesn’t stray too far from its core mechanics.

THE SCHOOL IS AN ASSET FOR YOUR GAME

This sentiment was repeated numerous times in the section on “the educator perspective”, but it’s equally important for developers: when you work with educational games, you need to be highly aware of the educational setting your game is going to be used in. For teachers, this is important since they need to feel that the game works with their own skills and working processes – for developers, it’s important since you need to feel that the teacher and the classroom works with your game. Some of the basic difficulties present in creating educational games as opposed to entertainment games have already been described: the good news is that there are components in the educational setting that can help alleviate those difficulties for you. A school and its students and teachers should not be treated as strictly limiting factors and can be deliberately used to elevate your game.

The two primary responsibilities you have as a developer when creating educational games are to ensure that the game is a) functional and useful for the educator, and b) engaging and educational for the student. The challenges involved in achieving each goal have already been described – functionality is in large part tied to how well your game accommodates for a school’s infrastructure, creating engaging gameplay can be difficult since the classroom constitutes a deceptively heterogeneous audience, and educational value depends on whether your game makes students reflect on a subject matter in meaningful ways. Meeting all these challenges strictly by creating a cleverly designed game isn’t really a feasible proposition. But if you let your game “bleed into” the school environment and the school environment to also bleed into your game you might be able to create something that makes good on both the promise of interesting functionality and engaging and educational gameplay.

REPRESENTING SUBJECT MATTER AND ENSURING EDUCATIONAL VALUE

To represent subject matter and ensuring educational value, the educational game can be designed deliberately with teacher involvement in mind. In this case the design isn’t really limited to the actual gameplay and the in-game content, and it can involve creating things surrounding the game that allows teachers to anchor the game in the subject being taught. An advanced way of doing this is to actually provide the teacher with editing tools, so that they can insert subject relevant scenarios into the game themselves. This requires you to design an accessible editor, however, since most teachers aren’t that familiar with software or game editing. Another approach is to provide specific guidelines, examples, and tutorials for how the teacher can contextualize and evaluate play sessions through classroom activities before and after the gaming sessions.

Making sure that the teacher has an opportunity to contextualize and guide gameplay sessions
in an educational direction relieves you, the developer, from a fair bit of responsibility. The alternative – designing a game that conveys subject matters without teacher involvement in mind – requires you to represent the details of a taught subject accurately and clearly to ensure that the students don’t receive faulty information or misinterpret anything, and that the game encourages reflection and analysis during play. When a teacher is invited to participate, either as a game master or as the person anchoring the gaming activities to the subject matter, you are free to be more abstract, conceptual, and symbolic in your game design.

**Designing a Game that is Engaging for Different Types of Players**

We’ve established that the heterogeneity of classroom audiences makes the creation of engaging gameplay difficult since you need to cater to many students’ different levels of gaming skill and preferences simultaneously. Once again, making the teacher and the classroom environment an integral part of your educational game can help you overcome this challenge. Teachers can for instance provide additional challenge, or they can identify which students would benefit from either skipping to more difficult sections of the game to keep them from feeling bored or repeating previous sections or lessons if they’re struggling.

In essence, you should try to create games where the challenges transition between the game environment and the physical and social classroom environment the game is situated in. Similarly to educators, developers should consider gaming sessions as pieces that can fit into different points of a broader educational process. The educational game is not meant to function in isolation from the other pieces in the educational process, and all pieces can spill into and influence each other positively. Providing openings for teachers and students to make these transitions also allows them to approach the game on their own terms and with their own ambitions, they will create settings surrounding the game that makes the game resonate with their interests. In game design terms, what you’re doing is facilitating emergent gameplay scenarios. If the basic ruleset of a game is too simplistic to keep students engaged, the teacher or students can establish more rules together to make the gameplay more enjoyable for themselves. If the theme of a game doesn’t resonate with a class, they can create new fiction around it or start thinking of it as an analogy for something they actually are interested in. These situations can arise from unexpected directions, and it’s not easy to foresee and accommodate for all possible scenarios that can arise. But you can keep teacher and student involvement in mind, and think of them as co-designers of gaming sessions once the game is out of your hands as a developer. If you’re creating an adaptable game that you want many different types of schools to use in different subjects, this mindset is especially important.
To conclude this guide I’ll briefly summarize some of the main lessons it intends to convey. Hopefully the guide has described some of the challenging practicalities inherent in the use and development educational games. Educational games can certainly be useful and interesting. But, it is important to approach them with a balance of optimism and realism – you need to simultaneously understand the limitations of games and education, while also having an eye towards ways of improving them or working around them.

**Know What to Expect**

Whether you’re an educator or a developer, you should not go into an educational gaming project without being properly prepared for what you can expect to achieve.

If you’re in education, you should not expect games to be an educational solution that works autonomously. Games need maintenance and supervision just as any other educational tool. You need to contextualize gaming activities to your taught subject matters by bridging gameplay to the physical and social environment of the classroom.

As a developer, you should not expect to be able to run your studio as a “normal” gaming studio. You need a keen awareness of what types of educational settings you’re working towards. You also need to be aware that educational game design constitutes very different challenges than entertainment game design. An educational game needs to work with educational processes, and it is challenging to create gameplay that is engaging to the heterogeneous audience you find in a classroom.

**Know the Educational Setting**

Understanding the properties of an educational setting is essential if you intend to develop or use a game inside of it.

Schools are intricate organizations and an educational game needs to accommodate for their infrastructures to work well. The average classroom environment might not have a reliable setup of high-performance computers or tablets, classes might be scheduled in a way that prohibits long gaming sessions, and teachers’ time to plan lessons might be very limited. For these reasons, it is as important to consider educational game development as an act tool creation and not just as game creation.

If you understand the setting well, however, it can be a great source of inspiration and support for different types of game scenarios that aren’t feasible in other places. Working with the educational setting can also lessen the responsibilities placed on a game’s content and open it up to new creative challenges.
For educational games to actually be functional, educational, and engaging both educators and developers need to think about their crafts in new ways. Game developers need to re-evaluate their opinions on what “good game design” is, just as much as educators need to be open to re-shape their working processes to open them up for games. Educational game projects are diplomatic challenges for both educators and developers, and it’s easy for to feel as though you are forced to constantly compromise your vision to fulfil the demands placed on your client or project partners. Compromises need to come from both directions, though, and at the end of a project – if you keep an open dialogue going – you will likely end up with something different but far better than what you set out to create.

Games are not educational by default, and educational institutions are in many cases not structured to incorporate games. Both developers and educators need to re-think their work together in order to meet in the middle and create something meaningful.
Scandinavian Game Developers is a collaboration between Århus Social- og Sundhedsskole, The Animation Workshop in Viborg, the University of Skövde, and Viden Djurs in Grenaa.

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