Let the games begin!

Tips & tricks for game-based teaching

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Can I explain an epidemic model using Plague Inc.? Can I illustrate assumptions about market mechanisms with Football Manager and urban planning with SimCity? What can historical games tell us about the historical culture of the society they're developed in? Can I use strategy games for what-if analyses? A teaching method called 'game-based teaching' has the answers.

Students play lots of video games. Yet the gaming world and the academic world rarely coincide, which is a pity because games can achieve a great deal in education. In a previous ECHO Teaching Tip (2021), we already briefly explored the possibility of using online simulations and games during practicals. This ECHO Teaching Tip aims to provide **a framework and practical advice on integrating a video game into a programme component**, based on educational literature as well as on real-world experiences of trial and error. Several teachers already use video games today. They usually focus on the choice of a particular game, and develop the corresponding didactics as they go (Garcia Martinez, 2014). In this teaching tip, we will share inspiration and tips for using video games in university programme components.

Video games in education

The use of video games in education can take two forms: gamification and game-based learning. **Gamification** integrates typical game elements such as points systems and badges into the learning material to increase engagement and motivation. For example, a badge is awarded to the student who is most active on the online discussion forum of the programme component.

In the case described by Jackson (2020), teachers noticed there was a need to update the lifeguard training programme. They wanted to make better use of digital learning technologies to offer a more familiar and memorable learning experience to their young audience. Gamification was used in the design of the online learning environment to increase engagement and to help learners memorise important content. For example, speed tests and simulations are now a key part of every module.

Learners are motivated to achieve the highest possible score by collecting badges.

In **game-based learning**, the learning activities are designed in game form from the outset. The game itself is the learning material or part of it. Examples include economics students holding a stock exchange competition or political science students simulating collective bargaining agreement negotiations.

At UAntwerp, 'Quality in Pharmacy' is a pharmacy game (info in Dutch) that has been part of the Magistral Preparations and Quality Assurance practical since 2008, to help students prepare for their internship in the Pharmacy and Drug Development master programmes. For this game, students are divided into small groups and tasked with running a virtual pharmacy by responding to realistic cases. Each group's pharmacy can win or lose clients, depending on the solutions they offer to treat these cases.

In SimCity, a popular video game distributed by Electronic Arts, the player takes on the role of mayor of a simulated city. The goal is to expand the city and grow it into a fully-fledged metropolis. The player has to manage various factors such as the power supply, the employment rate and the level of pollution. This game lends itself to the development of lessons about the environment, spatial planning, economics, and so on.

In short, gamification applies game elements to existing learning activities, while game-based learning transforms learning activities into a game format (Gamification and Game-Based Learning | Centre for Teaching Excellence | University of Waterloo (uwaterloo.ca)).

In what follows, we will focus on game-based learning, as this includes playing a video game in the context of an academic study programme.

Pros and cons

Game-based learning can have **advantages** for both the students and the lecturer. Previous examples have already shown that games can be used for the acquisition of new **knowledge** (Boyle et al., 2016; Vlachopoulos & Makri, 2017). In addition, students can also develop different types of new skills.

For example, video games **stimulate observation skills, analytical skills** and systems thinking. Students learn to formulate hypotheses, to interpret contexts, to come up with explanations and to describe what they observe. By allowing students to see the results of their actions in a game setting and by requiring them to engage in problem-solving thinking, games lead to 'a more active, transformative and experiential reception of knowledge' (Vlachopoulos & Makri, 2017). In addition, by playing games, students learn to engage in **systems thinking**: 'how does this system work, what are the important variables and what happens if I change them?' (Vlachopoulos & Makri, 2017).

By playing SimCity, students will learn to understand how a city (simulated or real) functions and how small events relate to the system in which they occur.

Games can also help foster students' **cooperation competences.** Playing a game promotes interaction between students and elicits peer feedback, which leads to the joint construction of knowledge (Boyle et al., 2016; Vlachopoulos & Makri, 2017). This ECHO Teaching Tip

(2018, in Dutch) provides more information on cooperation competences.

The use of video games could even lead to **better study results**. After all, by playing certain games, students learn new skills, and they receive immediate feedback as they play. In addition, playing in itself often provides extra motivation. Using a video game in a programme component can provide a nice 'change of pace', thereby contributing to the variety of teaching methods and to the students' interest in the subject (Talan, Dogan, & Batdi, 2020; Vlachopoulos & Makri, 2017).

Finally, video games are a form of **activating and student-centred education**. These are just some of the advantages of game-based learning.

The advantages of integrating a video game into a programme component are therefore potentially interesting. However, there are also some **pitfalls**. Firstly, the character and dynamics of the game should match the **competences** of the programme component. Not any game will do. When choosing an appropriate video game, it is important to ensure a link between the competences and the selected game, and to point this link out to the students. This way, the purpose of this teaching method instantly becomes clear to them (Vlachopoulos & Makri, 2017).

There is also a risk that students will lose interest if the video game is **outdated or visually unappealing**. That is not to say that the game experience in the context of a programme component always has to be 'fun'. After all, there is a difference between a game's didactic appeal and its overall appeal. When communicating about the game you've chosen, you can indicate that in this specific case, it is useful to play an older game (Vlachopoulos & Makri, 2017).

Finally, using a game during lessons can come at a **cost**. Having a new game developed specifically for a programme component will usually be too costly. In the practical advice section (see below), we will discuss how to limit this cost. After all, there are plenty of affordable options that can be purchased (online or in a shop) and there are also a lot of free materials out there.

Gaming and competences

Playing a video game in the context of a programme component should of course be **a means to an end** and not just some free playtime. The competences must first be

clarified before the game can be played. You can use the following non-exhaustive list to check whether the competences of a programme component can be linked to competences that can be achieved through a video game:

- staging theories from professional literature;

- testing what-if scenarios;

- putting oneself in someone else's position;

- dissecting systems;

- analysing video games as a cultural product;

- recognising and explaining assumptions, biases and inaccuracies in games, e.g. by comparing the game to reality.

It is important to ensure strong integration of the video game into the programme component. After all, less specific and more exploratory gameplay will lead to the achievement of less specific competences. That is why the competences need to be made explicit and the game needs to be developed around them. For example, you can work with predetermined scenarios and explain why this scenario is relevant and how it relates to other elements of the programme component.

During the lectures on politics and institutions in the Middle Ages (Bachelor of History, UAntwerp), video games were used to let students gain insight into processes such as succession. In medieval kingdoms, succession was extremely important. By simulating this in a game such as Crusader Kings II (by Paradox Development Studio), students can explore the dynamics of succession and the factors that influence it. Students all start with the same monarch in the same year and then evaluate how the game progresses based on the automated choices of the game and the decisions they make as players.

Taking differences into account

Students may **be more or less familiar with video games**. Not all students are equally interested in video games, let alone equally competent at playing them. There are classic fault lines in the student population that run along aspects such as gender and age. Some students will be more skilled at playing and may show a greater appreciation for this teaching method than others. However, the open-minded view of students without much prior gaming knowledge can also lead to apt observations. In game-based learning,

the focus is not on the students' ability to play, but on their analysis of the game in relation to the predefined competences. This ensures a level playing field for all students to achieve these competences in the end.

It is important, however, to inquire about the students' **familiarity with video games**, especially when they have to work in small groups, so you can team up students with different profiles (those who rarely or never game and those who game regularly) – see also this ECHO Teaching Tip (2018). Even when students will be playing individually, it is best to inquire about their familiarity with video games beforehand. This will allow you to ask more specific questions during gameplay and during the debriefing.

Choosing a game

The game to be played needs to be a good match for the specific learning objectives of the programme component, so choosing the right game is crucial. **Parameters** to take into account include the time needed to learn how to play the game, your own experience with the game, and the cost. In terms of the cost, buying a game is often much less expensive than having your own game developed from scratch.

Just like for textbooks or professional literature, **reviews** of video games can help you decide. You can consult various reviews at GameSpot or PC Gamer. In addition, you can find a lot of high-quality games at little to no cost on the gaming platform Steam. Finally, you can find inspiration in Schrier's book (2019), which discusses the applicability in education of over 100 video games – including the popular Assassin's Creed franchise and Railroad Tycoon – using case studies.

Several different **genres** of games can be used and linked to different academic domains. History, for example, is featured in strategy games, while economic principles are at play in online role-playing games (with certain market mechanisms) and in sports strategy games such as Football Manager and the FIFA franchise, and biology is an integral part of the digital version of the Evolution board game.

Practical organisation

The video game can be introduced at the start of a programme component, as an eye-opener for a certain problem, or at the end of a series of lectures, as a tool to process and apply the newly acquired knowledge and skills.

Below is one possible **model** for integrating a video game into a university programme component, developed by Professor Jeroen Puttevils (Department of History, UAntwerp). This model is the result of trial and error, with constant reflection on the best didactic framework for this teaching method.

(1) Preparatory lesson

During a short lesson, the students are introduced to the genre of the chosen video game. The lecturer connects the genre to the field of study that the programme component relates to. Next, students are asked about what video games they play or used to play. This information can be used to categorise the students into different profiles. Then, under the guidance of the lecturer, students debate the possible ways in which video games and the academic approach to the subject can go hand in hand. This is also the time to indicate very clearly which competences you will be focusing on. Then it is time to discuss the gaming session and the debriefing session. What do the students have to pay attention to? Do they have to carry out certain tasks? What should they take note of? What will the debriefing session be like? And what role will you, the lecturer, be playing during both the gaming session and the debriefing session?

(2) Gaming session

There are various **locations** where the gaming session can be held: at a gaming centre, in a regular classroom, or in a computer classroom. In the case of a partnership with a local gaming centre, the game will have to be a current and popular one. Choosing a local gaming centre, for example Outpost Antwerp, has the advantage that you can ask the staff to give a short expert introduction to the game. Chances are also slim that you will run into technical issues here. The students then pay a small fee to play the game. While a gaming session in a regular classroom is certainly possible, you are much more likely to run into technical problems, as every student has to install and run the game on their own laptop. The risk of technical issues is lower when you use a computer classroom on campus. You will need to consult with your institution's IT department to get the game installed on the computers. In either case, it is up to you to introduce and explain the game.

Depending on the size of the student group and the predefined competences, students can play either **individually or in teams**. While there are several popular online multi-player games – where people can log on to a server and play together in a virtual world – this is not recommended, as students would get distracted from the game itself by interacting with other players.

Actual gameplay will of course depend on the game. It often helps when students who have never played the game follow a **tutorial** first (possibly at home), so they can familiarise themselves with the basic game controls and mechanics. For the actual gaming session, you can choose or write a **scenario** to be played by each student. You can also opt for a more open exploration of the game by the students. However, as mentioned earlier, this is less likely to result in the students achieving the predefined competences.

During the gaming session, students keep a **log**, taking notes but also screenshots, for instance, which they can use for later assignments, as well as during the debriefing session. As a lecturer, you walk around and assist the students with certain game situations and ask them questions about teachable moments in the game. This way, you help them to achieve the competences and you can give individual feedback they can use to complete their logs. At regular intervals, say every 20 minutes, everyone pauses the game. During these **breaks**, students can ask questions and adjustments can be made where necessary.

Usually a gaming session of **two hours** is sufficient to achieve the learning objectives. If they want (and if possible), students can continue to explore the game at their own pace later.

(3) Debriefing session

The debriefing session is an **important part** of this teaching method, so be sure to allot sufficient time to it. After all, this is the moment when students can gain important insights, when any misinformation or misinterpretations are corrected, and when the link to the competences is reiterated and reinforced. Ideally, the debriefing session should take place immediately after the gaming session.

Kriz (2010) suggests using the following set of questions during debriefing sessions:

What feelings did you experience during the game?

What happened over the course of the game? What did you observe?

In what ways are the game simulation and what happened in it consistent with what we know about reality?

What did you ultimately learn from this exercise? Can you identify the most important conclusions?

What dynamics have you discovered based on what-if scenarios? Suppose player X had been able to take territory Y, what would the dynamics have been afterwards?

Where do we go from here? What do you take away from this?

As a lecturer, you moderate and lead the discussion and ensure that every student has their say. You can opt for an open dialogue or you can take a rigidly structured approach, for example by presenting a set of statements and having students respond to each one in turn. A great added bonus would be to invite someone who was involved in the development of the game, so the students can discuss the game with this expert.

(4) Assessment

The assessment of a gaming session can take different forms depending on the game itself, its place in the programme component, and the predefined competences. Students could write an individual or group essay, with or without an oral presentation, or a short blog post, for instance. Be sure to make the purpose and criteria for this task clear in advance. Students can get inspiration by reading reviews of the game and consulting internet forums. Experience shows that students who do not normally play video games are just as capable of writing a good essay as avid gamers.

Want to know more?

ECHO Teaching Tips (in English)

- [Dividing students for group work? (2018)](#)

- [Online practicals: why, what and how? (2021)](#)

ECHO Teaching Tips (in Dutch)

- [Ondersteunen van samenwerkingscompetenties: Studenten 'leren' samenwerken (2018)](#)

Sources accessible only to UAntwerp staff (login required, in Dutch)

[Good practice Apotheekgame](#)

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