

Teacher roles in learning games

- When games become situated in schools

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ABSTRACT

Using learning games in education gives rise to a learning situation where game culture meets school culture and the result can be successful or corrupting for both. In this paper I present a case study of school classes and their teachers playing the game 'Homicide', a game where children play the roles as forensic experts who solve a series of murder cases. When teachers use this type of games, they have to adapt to new teaching situations and roles. This includes the fictional role in a game, but also the role as a supervisor for a group of students that play the role as professional experts. I present examples of teachers who adopt different roles in the game, and discuss how understanding the background for these roles can help us define the game-based learning situation. Finally I discuss what consequences the problems presented here may have for the design of future learning games.

Author Keywords

Learning games, science education, teacher roles.

INTRODUCTION

In recent years, research institutions have been a test-bed for development of a new type of game, a generation of games that simulate professional practice. These games are created to bring a practice situated in a professional setting into schools. Internationally, there are several examples of this type of learning games that have been developed at universities and are currently used in schools [4, 8, 5]. This type of games has been defined as 'Epistemic games' by David W. Shaffer [7]. Each profession has its own knowledge, values and skills - its 'epistemic frame'. The game media gives us a way to simulate these ways of seeing the world. The goal with these games, where children role-play professions to learn professional ways of knowing, are that children learn to solve problems in the real world and how to be innovative within a profession.

But what happens when these games meet school practice? This is the overall theme of the larger study this paper is based on; to understand what happens when this class of games becomes situated in schools, and to understand what emerges out of this meeting. The case study involves school classes and their teachers playing the game Homicide, a game where children role-play as forensic experts who solve a series of murders. It is a complex situation, and when we design and evaluate the game, we have to understand the different practices that come into play in the learning situation: There is the professional practice we are trying to simulate, the school practice it is placed in and there is the game practice that frames it all. All these domains have values, rules and demands for the play and learning situation and we have to understand in what sense these practices are present in different game learning situations.

This paper presents examples of roles adopted by teachers playing the game. When teachers use profession simulation games in their education, they have to get used to new roles. This can be the fictional role they play in the game or the role they come to play in the class as a supervisor for a group of expert students who essentially have more detailed knowledge than the teacher on the game subject. I present two different examples of student - teacher interaction in the game Homicide and discuss the different domains that play together or against each other when this class of games enters school.

THE GAME HOMICIDE AND HOW THE TEACHER ROLE WAS INTENDED

Homicide is an IT-supported game where players role-play forensic experts. It was developed by a game development group at Learning Lab Denmark (the author of this paper was a member) and was published by the Danish school book publisher Malling Beck. The game takes one week to play through, from eight in the morning to one or two in the afternoon for five days. It is organized as a combination of

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work in investigative groups (each working on their individual case) and meetings where groups share information about their cases and are encouraged by the chief of police - the teacher - to set new goals in their investigation. After each meeting, the teacher makes new parts of the game accessible on the computer, which gives the investigators new information to work with. The game ends with the groups presenting their theories to the other teams and writing an indictment based on the evidence and testimonies of suspects and witnesses. The interaction in the game is primarily between the students in the classroom and not a computer-student interaction as in most computer games. Instead the computer is used as an extended police database.



Figure1: Homicide, Interface the policeman's desk.

The game's interface provide the players access to videotaped interviews with 'suspects', reports from the local police, maps and pictures of and information about evidence found at the crime scene. With this information at hand the players have to plan their investigation process. The investigators analyze the evidence through laboratory work and analytical processes using technological and scientific, theoretical and practical methods that are available in the Forensic Handbook which is part of the data base. Some of this work is pen and paper tasks and some practical analysis in the school laboratories. The laboratory work includes chemical analyses of samples from a suspect's hands to determine whether that person has gunshot residue on his or her hands, which would indicate that the suspect has fired a gun lately; and measurements of shooting angles to determine the height of the shooter. The students have to handle different types of data and use different skills, including critical thinking when they analyze interviews with the suspects and empirical competencies in handling the data from the technical investigations.

The educational goals of the game are closely integrated with the fictional investigation process. The overall goal for cross-disciplinary science learning in the game is that the game should support working with, and learning of, the process of inquiry as the basis of scientific investigation. The process contains different steps: problem definition, establishing hypotheses, conducting investigations, making

observations, collecting data and explaining results. The methods used to solve the murders, e.g. fingerprint technique are as close to the real forensic professional methods used by forensic experts as was possible. The students have, of course, seen movies and read about police work, and getting a chance to use the professional tools are meant to further their motivation.

In the manual the teacher's role is primarily defined as a helper and initiator. The teacher has access to all the answers and should advise students by asking open questions that will help players focus and get back on track if they get stuck in the investigation process. The pupils can get the data they need from the 'police database' but the teacher is still in control of what is released at what point in the game. In the manual, the teacher is also encouraged to role-play the chief of investigation who advise the investigators, but let them take the decisions. The chief sets the agenda at the status meetings where all the groups reports to each other and he or she asks critical questions about the further investigation. The teachers should work on striking a balance where they play roles to a degree that feels natural to them instead of not playing roles at all. In the manual, the teachers are reminded that it can be disrupting for the pupils' identification with their roles in the game if they have to step out of the role in the game and into the 'pupils' role whenever they speak to the teacher. In the manual it is stressed that it is important to maintain the illusion throughout the game that the pupils are doing something important in solving the cases, this keeps up motivation for conducting the investigation process.

We received several comments about the teacher manual while we worked with different groups of teachers. In comparison with traditional school books and other materials sold by the publisher, the IT-supported role-playing game is a novelty to many teachers. The teacher therefore expressed a need for a quick overview of the game situation that the teachers' manual did not provide.

Before we initiated the game test, the author of this paper therefore used one or two three-hour sessions with the teachers after they have had a chance to study the game manual. The teachers were both introduced to the technical side of the game (the student and the teacher interface) but also to the role of the teacher and how he or she was expected to role-play as chief of investigation. References to fictional characters from the Danish TV series Rejseholdet and the American show CSI were used as concrete examples of police characters that serve as role models. The teachers were also encouraged to set up working spaces for each group to use for their investigation process. During the game week the observing researcher did some coaching on IT issues, the running of the game and made suggestions about where and how to run status meetings.

TEACHERS' ROLES IN HOMICIDE

The study presented here is based on a larger study of four different school classes with different teachers who played Homicide. It is based on five full weeks of full-time video observations - around 120 hours of film (in one of the classes there were two researchers filming) in total. The students in the classes were from 13 – 15 years old. Apart from the video observations, group interviews were done in all the classes with students and teachers and pre- and post tests of how the game broadens the students' understanding of the police inquiry process. This study is also based on the diagrams and log books the students produced during the game.

The following examples from a set of observations of a 7th grade school class who played the game over a full school week. The observations were conducted by the author of this paper and a research assistant. In this class the game was run by two teachers, a male science teacher and a female Danish teacher. These examples of contrasting approaches have been chosen because they illustrate the problems that arise when teachers changes roles in the game. These are also example of approaches to the game-learning situation I (more or less explicitly) have observed in all the school classes that I have done observations in. I believe that understanding the background for the teacher-student interaction and the problems it creates will provide us important clues to defining the learning situation in this class of games.

This first example is from a situation where the male science teacher helped a pupil to take fingerprints. The class was midway through the game. They were on a level where they had to analyze traces like fingerprints, DNA in blood or gunshot residues from the hands of the suspects. In the specific situation, the groups had just received some objects such as a CD cover and a hammer in professional-looking plastic bags that they had to analyze for fingerprints. The finger-print analysis is a special feature in the game design. It is of course impossible for the students to analyze real fingerprints from the characters as we would then have to call in the actors who play them every time a school buys and plays Homicide. Instead, the game is designed to let the teacher secretly place a fingerprint on the object. The teacher is then instructed to collect the fingerprints after they have been lifted by the pupils. He then secretly ticks off the task on the teacher interface and a scanned fingerprint appears on the pupil's interfaces where they can compare to the suspect's fingerprints to find a match. The specific objects - like the hammer - are described in the case file as a possible murder weapon. The analysis of the fingerprints on it may provide central clues to who committed the murder in the specific case. The pupils use genuine professional tools such as powder, brush and film to lift the fingerprint off the object.

In the specific situation, members of two groups were standing and sitting around a table in the common area where the workstations were. Two members – a girl and a

boy – from different groups were using a brush to apply powder to the objects they had received from the teacher. There were a lot of children from the different groups around the table. These were the first two groups who were lifting fingerprints and members from all groups were interested in how it is done. The girl (girl1) had just finished brushing a hammer that she believed was the murder weapon. The fingerprints she was supposed to lift was not clear. In this example she was asking the teacher Thomas to take a look at the hammer she was testing for fingerprints. Thomas came over and stood beside her while they talked.

Girl 1: Thomas could you come over here, please?

Thomas: Yes

Girl 1: I don't think this is clear. I can't even see it.

Girl 1: You can see theirs' (their fingerprints) (points to the CD the other boy at the table is testing for fingerprints)

Thomas: Try this instead, I know that... (low-voiced, inaudible)

Girl 1: That's not ours

Thomas: No, I know. It's some extra things I have if it didn't work.

Girl 1 uncomprehending takes the plastic bag he gives her.

Another girl (Girl 2) has been following the conversation between Thomas and Girl 1.

Girl 2 to Thomas: But what will that help?

Thomas: The point here is that you must practice lifting fingerprints off objects.

Girl 1: Should I just try here again? (she points to the hammer.)

Thomas: Yes, try again, but if you don't find anything, then try those (point to the objects he has just given her).

Girl 1: Yes, then I'll try those.

Thomas: Try and look at those too. (The objects he has given her.)

Girl 1: But this is not some of the things we get?

Thomas: No

Girl1 kept brushing powder on the hammer, but after a while she started testing a black disk - one of the new things that the teacher had given her. Two girls from another group were waiting at the table for Girl 1 to finish. When she was almost finished, they started to discuss what to do. One of the girls asked how it is possible to find out whether it is a suspect's fingerprint. She was told by the other girls that she can not find the murder by using the fingerprint,

because it was not the real fingerprints. Another girl who is confused with the explanation asks what the print then can be used for. She is told that she had to give the print to Thomas, who would then give her some more information.

In the example, it is clear that the teacher undermines the game on different levels, and that this has a clear impact on the student's engagement. If the teacher had told a student in a non-game-based science class that practicing a technique was more important than the result itself, it would possibly not have caused the same confusion as we can see in the above example. But why is this? In answering this question it might help to try and understand the different levels in the game-learning situation in this type of games.

From the game perspective, it is interesting to note the immediate response to Thomas' actions. There is no doubt that students aged 13 are fully aware that they are playing a game and not solving four real murder cases. But still the role-play creates a space where it makes no sense to girl 1 and 2 (who observes the situation between Thomas and girl1) to test objects that play no role in the game narrative. Their confusion and questions lead the teacher to explain his perspective on their work: that practicing fingerprint technique that is the important part of what they are doing and not the results of the technical analysis.

It is quite understandable how this conclusion makes sense to Thomas. The fingerprint is not used for any further analysis. After lifting the fingerprint, the students print out a scanned fingerprint that is used in the further comparison with suspect's fingerprints. With this background knowledge it is clear why Thomas come to the conclusion that the process and not the result is important. In the game material, teachers are both instructed (as described above) in their overall role as chief of investigation, and also to provide students clues that resemble the objects on the pictures from the crime scene, e.g. the same brand of hammer as on the picture. The possible pedagogical background for Thomas' approach will be discussed later in this paper.

From a game culture perspective, the students' confusion might come from a change of the basic game mechanics. The basic rules in Homicide are that all the things from the crime scene that are made available to the players could potentially provide them with important clues to who committed the murder. If they do a thorough analysis of these things and the interviews with the suspects, they will eventually be able to put the collected pieces together and solve the puzzle of who committed the murder. In this context it clearly makes no sense to the students when Thomas tell girl 1 to do fingerprint analysis on a disk that that is not described in the case file as an object found at the crime scene. When he furthermore tells her that the fingerprints she is in the process of lifting are unimportant, he breaks the basic rules of the game.

The teacher might not be aware of how changing the game rules breaks the pupils' illusion that they conduct important

actions in the classroom context. This can be seen as breaking 'The magic circle of the game' (Salen & Zimmerman, 2004). The magic circle of a game is defined by Salen and Zimmerman as 'the space within which a game takes place.' (Salen & Zimmerman, 2004). In this definition, the magic circle is created whenever players decide to play a game. They can step into a formalized circle with set rules (like backgammon) or they can create their own magical circle (like arm wrestling). The circle is the boundary of the game space where the rules of the game have authority. In this space game objects obtain special meanings:

'Within the magic circle, special meanings accrue and cluster around objects and behaviors. In effect, a new reality is created, defined by the rules of the game and inhabited by its players. Before a game of Chutes and ladders starts, it's just a board, some plastic pieces, and a die. But once the game begins, everything changes. Suddenly the materials represents something quite specific. This plastic token is you. These rules tell you how to roll the die and move. Suddenly it matters very much which plastic token reaches the end first.' p. 96 [6].

The group of girls in the situation might thus be well aware that they are not solving real murder cases, but they have on some level agreed to step into the magic circle of the game and become police investigators. The reaction of confusion and disbelief from the group of girls could illustrate that the magic circle of Homicide and the meanings it gives objects like fingerprints make the situation meaningful to the girls. Breaking the circle makes their actions meaningless as the example illustrates.

This next example is from the same class where the other teacher in the team, Anna, helped another group. In this situation, the group was on the final stage of their investigation and they were comparing the data they had to find the crown suspect. In this example the teacher were discussing the case with the pupils in their workspace where they had put pictures and papers with test results on boards.

Anna: How firm is your evidence?

Boy 1: His (Preben – the crown suspect) fingerprints are on the hammer.

Anna: The hammer that killed him (Adam the victim)?

Boy 1: Yes.

Anna: Yes.

Boy 1: And he (Preben) has a shirt with blood on.

Anna: Blood from Adam too?

Boy 1: Yes.

Boy 2: And he has a reason for killing him because his 15 year-old daughter is pregnant with Adam's child.

Girl 1: He didn't know.

Anna: He didn't know?

Boy 1: No. It's a motive

Anna: Do you think that that would be enough to get him convicted?

Boy 1: And he doesn't have an alibi.

Anna: What was that?

Boy 1: He doesn't have an alibi

Anna: Have you spoken to him?

Both boys: Yes

Anna: After you have found out about this?

Girl 1: No

Boy 1: No they are (pointing to the girls working at the computer) doing that now.

Anna: Maybe it would be good to confront him with the new evidence and hear what he has to say about that, right? Okay, and then I think you should spend a little time to find out if the evidence you have is good enough. Is it valid in court? And if you agree that it is then you have to try and reconstruct the crime based on your data and from what you can work out yourself. That's the next thing, right?

Anna leaves and the two boys get into a long discussion on what the evidence points to.

The teacher Anna guides the pupils through the analysis by asking open questions. Even though Anna is not directly role-playing the chief of investigation, her focus is on the 'professional' work of solving the case. With questions such as 'have you spoken to him?' she refers to actions that are done on the computer in the game as if the students were actually confronting the suspect in person. This rhetorical trick makes actions in the game seem more 'real'. Anna's focus on whether the clues the students have will be enough to get the main suspect convicted also shows that her success criteria are in line with the game goals. It thus seems that she stays in the magic circle of the game by using terms and expressing the same goals as what was intended in the professional role. This also seems in line with the students understanding of the situation and creates a constructive teaching situation where students are helped to continue the inquiry process after the supervision.

DISCUSSION

In this paper I have presented two different teachers approaches to the game learning situation. It is essential to understand the background for these teacher roles to define what is specific about the game based learning space in these games.

In the example with the teacher Anna, the roles between teacher and pupils are quite different from the first example. At the end of the game, the children are experts on their

case, and Anna is the chief or supervisor that might not know (or appears not to know) all the details of the case, but supervise the investigators in constructing a strong case from the knowledge they have. This solidifies roles of knowledgeable experts and the supervising teacher or chief investigator.

In the example with Thomas, we see a different approach to the learning situation. Telling students that practicing the fingerprinting technique is important and not the result, Thomas expresses a well known understanding of learning that is seen in many schools today: That the technique can be learned out of context and then be transferred and applied by the student to another setting.

What fails to make sense for the students in the game situation possibly makes perfect sense in a school context. If the situation with Thomas and girl1 had happened in an everyday science class, it possibly would not have caused the same kind of confusion, because in many schools science is learned out of context of the domain of knowledge that it is part of. This is what James Paul Gee calls the "content fetish":

'The content fetish is the view that any academic area, whether physics, sociology, or history, is composed of a set of facts or a body of information and that the way of learning should work is through teaching and testing such facts and information'

[1], p. 1.

Out of context, the meaningful and understandable goal that the profession simulation game creates – that students do scientific analysis to solve the mystery of who committed the murder – disappears. In this class of games this is closely connected to the simulation of the profession or domain of knowledge. As James Paul Gee defines it:

'Any actual domain of knowledge, academic or not, is first and foremost a set of activities (special ways of acting and interacting so as to produce and use knowledge) and experiences (special ways of seeing, valuing, and being in the world). Physicists *do* physics. They *talk* physics. And when they are being physicists, they *see* and *value* the world in a different way than do non-physicists. '

[1], p.1

Learning situations with clear meaningful goals where the challenges lie in understanding how to reach the goal are 'married' to the professional learning-by-doing approach.

The professional simulation game Homicide simulates this domain of knowledge - the way the police investigator sees

and understands the world. The investigators are primarily focused on results and only on process to the extent that it has to be precise and thorough to get good results. When Thomas tells students that the process is important and not the result it is not just the magic circle of play he breaks. The meaningful goals of learning within the domain of knowledge also disappear.

Should we then focus on developing games for out-of-school-settings to avoid the corrupting situations described in this paper? As we have seen there are teachers that can take on the advisor role both as part of a game fiction and as the professional teacher. Here both teachers and pupils take on other identities in the profession they role-play and solve professional problems both parts might not know the solution to. The teacher becomes the professional leader that might not know all cases or projects of the team but advises groups using a toolkit of perspectives and values within the profession they role-play. The pupil becomes the expert in a specific case which also gives her the role as competent problem solver in the specific project. In these games focus is thus not only on the content or product, but also on the professional roles the participants take on and the form of collaboration. I believe that by designing and testing these games in schools we as researchers and developers can learn something from the professionally competent teachers who master combining fictional roles with teaching students deep understanding of a subject. This might be also a cultural problem. The Danish schools are not yet as test-based as the American schools and teachers still have room for experimenting with new teaching forms.

The intention with this paper has been to use situations with the professional simulation game Homicide to understand what happens when this type of games becomes situated in

schools. A deeper understanding of the background for the teachers' roles will provide us with valuable elements for a definition of learning in this class of games. This will also give us an understanding of how to introduce teachers to this teaching form and how to develop new types of games.

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